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60/317,531 5 September 2001 (05.09.2001) **US**

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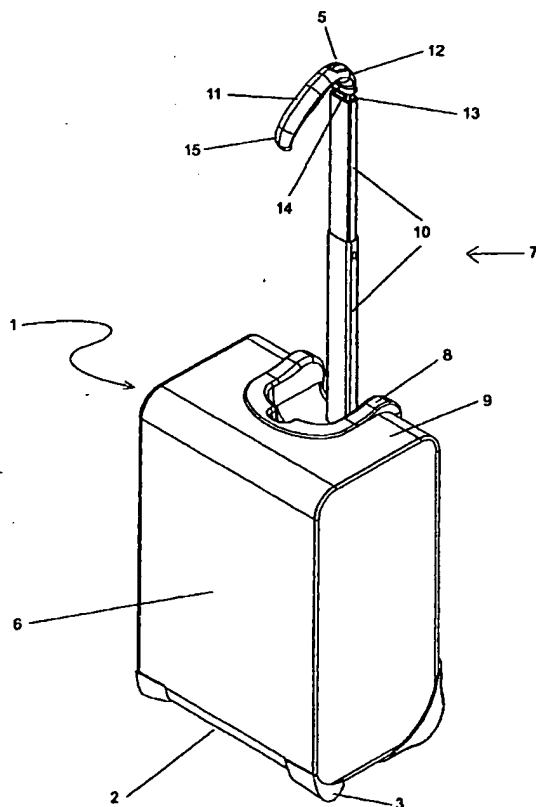
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[Continued on next page]

(54) Title: **HANDLE APPARATUS FOR LUGGAGE CASE**



(57) Abstract: A wheeled luggage case (1) has a single telescoping handle arm assembly (10) and a cantilevered handle grip (11) which is rotatably attached to the top end (13) of the handle arm assembly, such that the plane of rotation of the grip is approximately parallel to the rolling direction of the luggage case. The cantilevered handle grip (11) rotates from a position approximately perpendicular to the telescoping handle arm assembly (10) to a position approximately 30° below the horizontal, and a resilient element is provided which urges the grip to rotate downwardly while in use. The invention provides an ergonomically comfortable wheeled luggage case by allowing the user to grasp the grip in a natural position and, simultaneously, increasing the amount of leverage available to prevent the luggage case from tipping over when it is rolled over uneven ground. Further, the resilient element distributes the weight of the luggage case evenly across the user's hand.

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ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AMENDED CLAIMS

[received by the International Bureau on 28 February 2003 (28.02.03);
original claims 1, 7 and 18 amended (5 pages)]

1. A wheeled luggage apparatus, comprising:
 - a. a wheeled luggage case;
 - b. a handle assembly attached to the wheeled luggage case;
 - c. a cantilevered handle grip rotatably attached to the handle assembly such that the plane of rotation of the grip is approximately parallel to the rolling direction of the wheeled luggage case, and such that the cantilevered handle grip extends from the handle assembly in a substantially opposite direction from the rolling direction when in a deployed position.
2. The cantilevered handle grip of claim 1 further having a hinge assembly which rotatably attaches the grip to the handle assembly.
3. The hinge assembly of claim 2 further having a resilient element which supplies a force to the cantilevered handle grip and to the handle assembly, urging the grip to rotate downwardly around the hinge.
4. The hinge assembly of claim 2 further having an upward stop flange and a downward stop flange which limit the rotation of the cantilevered hand grip around the hinge assembly to approximately 30°.
5. The hinge assembly of claim 4 in which the upward stop flange is positioned on an outside portion of the hinge such that the upward stop flange limits the upward rotation of the cantilevered handle grip to a position in which the grip is approximately perpendicular to the handle assembly.

6. The resilient element of claim 3 in which the element is a spring.
7. A wheeled luggage apparatus, comprising:
 - a. a wheeled luggage case;
 - b. a telescoping handle arm assembly attached to the wheeled luggage case; and
 - c. a cantilevered handle grip rotatably attached to the telescoping handle arm assembly such that the plane of rotation of the grip is approximately parallel to the rolling direction of the wheeled luggage case, and such that the cantilevered handle grip extends from the handle arm assembly in a substantially opposite direction from the rolling direction when in a deployed position.
8. The cantilevered handle grip of claim 7 further having a hinge assembly which rotatably attaches the grip to the telescoping handle arm assembly.
9. The hinge assembly of claim 8 further having a resilient element which supplies a force to the cantilevered handle grip and to the telescoping handle arm assembly, urging the grip to rotate downwardly around the hinge.
10. The hinge assembly of claim 8 further having an upward stop flange and a downward stop flange which limit the rotation of the cantilevered handle grip around the hinge assembly to approximately 30°.
11. The hinge assembly of claim 10 in which the upward stop flange is positioned on an outside portion of the hinge such that the upward stop flange limits the upward rotation of the cantilevered handle

grip to a position which is approximately perpendicular to the telescoping handle arm assembly.

12. The resilient element of claim 9 in which the element is a spring.

13. The cantilevered handle grip of claim 7 in which a top surface of the grip is flush with an upright end of the wheeled luggage case, when the telescoping handle arm assembly is in a fully retracted position.

14. The wheeled luggage case of claim 7 further having a grip cradle disposed within an upright end of the case, the grip cradle having a grip locking assembly which secures the cantilevered handle grip within the cradle when the telescoping handle arm assembly is in a fully retracted position, allowing the grip to be used to carry the wheeled luggage apparatus.

15. The cantilevered handle grip of claim 7 further having a release button disposed within the grip, allowing a user to depress the button to unlock the grip from the grip locking assembly.

16. The release button of claim 15 in which the button is adjacent to a back end of the cantilevered handle grip.

17. The release button of claim 15 in which the button is flush with a top surface of the cantilevered handle grip.

18. A wheeled luggage apparatus, comprising:
a. a wheeled luggage case;
b. a telescoping handle arm assembly attached to the wheeled luggage case;

c. a hinge assembly which rotably attaches a cantilevered handle grip to a top end of the telescoping handle arm assembly such that the plane of rotation of the grip is approximately parallel to the rolling direction of the wheeled luggage case, and such that the cantilevered handle grip extends from the handle arm assembly in a substantially opposite direction from the rolling direction when in a deployed position,

d. a resilient element disposed within the hinge assembly which supplies a force to the cantilevered handle grip and to the telescoping handle arm assembly, urging the grip to rotate downwardly around the hinge;

e. an upward stop flange which is disposed on an outside portion of the hinge such that the flange abuts against the top end of the telescoping handle arm assembly and limits the upward rotation of the cantilevered handle grip around the hinge to a position in which the grip is oriented approximately perpendicular to the handle arm assembly; and

f. a downward stop flange which is disposed on an inside portion of the hinge such that the flange abuts against the top end of the telescoping handle arm assembly and limits the downward rotation of the cantilevered handle grip to a position which is approximately 30° below the grip's perpendicular orientation to the handle arm assembly.

19. The resilient element of claim 18 in which the element is a spring.

20. The cantilevered handle grip of claim 18 in which a top surface of the grip is flush with an upright end of the wheeled luggage case, when the telescoping handle arm assembly is in a fully retracted position.

21. The wheeled luggage case of claim 18 further having a grip cradle disposed within an upright end of the case, the grip cradle having a grip locking assembly which secures the cantilevered handle grip within the cradle when the telescoping handle arm assembly is in a fully retracted position, allowing the grip to be used to carry the wheeled luggage apparatus.

22. The cantilevered handle grip of claim 18 further having a release button disposed within the grip, allowing a user to depress the button to unlock the grip from the grip locking assembly.

23. The release button of claim 22 in which the button is adjacent to a back end of the cantilevered handle grip.

24. The release button of claim 22 in which the button is flush with a top surface of the cantilevered handle grip.

resilient force is applied to the hinge, causing the grip to rotate or hinge in a downward direction, while the luggage case is being pulled. This force acts to distribute the weight of the luggage uniformly across the fingers and palm of the user's hand. In this manner, a concentration of the luggage case's weight at the front of the hand is minimized.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of a wheeled luggage case with a handle assembly, including a telescoping handle arm assembly and a cantilevered handle grip, in an extended position.

FIG. 2 is a back perspective view of the wheeled luggage case with the handle assembly in a retracted position and the cantilevered handle grip locked into a portion of the luggage frame.

FIG. 3 is the same front perspective view of the wheeled luggage case as shown in FIG. 1 with the luggage case compartment shown in dashed lines in order to reveal the inner luggage frame.

FIG. 4 is the same back perspective view of the wheeled luggage case as shown in FIG 2 with the luggage case compartment shown in dashed lines in order to reveal the luggage frame.

FIG. 5 is a side view of the handle assembly with the telescoping handle arm assembly extended.

FIG. 6a is a side view of the cantilevered handle grip in its rotated or up position.

FIG. 6b is a side view of the cantilevered handle grip in its relaxed or down position.

DETAILED DESCRIPTION OF THE INVENTION

The present invention is generally described in connection with FIG.'s 1, 2 and 3. FIG. 1 illustrates a perspective view of a wheeled luggage case 1 which is tipped up on a bottom end 2 and is resting in a vertical position on a pair of bottom studs 3 and on a pair of wheels 4, which are adjacent to the bottom studs 3. The axle of each wheel 4, is in axial alignment with the other wheel, and each wheel and its corresponding axle is rotatably mounted to a luggage frame 16. A luggage compartment 6 is disposed around and attached to the luggage frame 16. A handle assembly 7 extends through a handle grip cradle 8 disposed within an upright end 9 of the luggage case 1. The handle assembly 7 includes a single telescoping handle arm assembly 10, which is depicted in its extended position. The handle assembly also contains an integral cantilevered handle grip 11 which is connected at a back grip end 12 to a top end 13 of the telescoping handle arm assembly 10 by means of a hinge assembly 14. The hinge 14 limits the rotation of the handle grip 11 to a vertical plane which is coextensive with the handle arm assembly 10 and generally parallel to the vertical plane of rotation of each wheel. A front grip end 15 extends away from the handle arm assembly 10 and across the upright end 9 of the luggage case 1.

FIG. 2 presents a perspective view of the luggage case 1 illustrating the handle assembly 7 in a retracted position, the cantilevered handle grip 11 disposed within the grip cradle 8, and the handle grip's front grip end 15 is releasably locked into the cradle 8.

In this position, the handle grip **11** can be used as a normal luggage handle to carry the luggage case **1**. The top portion of the handle grip **11** is flush with the upright end **9** of the luggage case **1** which prevents the handle grip **11** from being damaged. A release button **5** is also conveniently disposed on the top portion of the cantilevered handle grip **11** adjacent to the back grip end **12**. This location permits the user to easily release the handle grip **11** from its locked position within the handle grip cradle **8** by grasping the handle grip **11** and using the thumb to press the release button **5** down. The user then pulls up on the handle grip **11** in order to extend the telescoping handle arm assembly **10**.

FIG. 3 presents a "see through" perspective illustration of the luggage case **1** as shown in FIG. 1 with the luggage compartment **6** shown in dashed lines so as to reveal the luggage frame **16**, and a more complete view of the telescoping handle arm assembly **10** in its extended position. The luggage frame **16** consists of a bottom tray **17** and a top tray **18**, which respectively provide structural support to the bottom end **2** and upright end **9** of the luggage case **1**. The two trays are rigidly connected to each other by means of an outer tubular member **19**, which extends vertically between a back center portion of the bottom tray **17** and a back center portion of the top tray **18**. A pair of wheel retainers **20** are integral with the bottom tray **17** and are located at opposite back corners of the tray **17**. A pair of wheel housings **23** are adjacent to the pair of wheel retainers **20**, and each housing **23** holds a wheel axle, and its associated wheel, in axial

alignment with the other wheel axle, and its associated wheel.

Although not shown in the figure, each wheel housing **23** contains a pair of removable clips which permit a user to easily remove and replace a wheel assembly.

As can be further seen in the figure, the outer tubular member **19**, which is part of the luggage frame **16**, is also part of the telescoping handle arm assembly **10**. A first inner tubular member **21** is slideably positioned within the outer tubular member **19** and a second inner tubular member **22** is similarly slideably positioned within the first inner tubular member **21**. The first and second tubular members **21** and **22** are both shown in a fully extended position. Although not shown in the figure, the outer tube member **19**, inner tube member **21** and inner tube member **22** each contain internal locking mechanisms that lock the tubes in place when fully extended or fully retracted. These mechanisms also permit the tubes to be easily released from a locked position by simply pulling up or pushing down on the handle grip **11**. The user releases the tubes by pressing down on the release button **5** which activates a lever mechanism within the second inner tube member **21** which in turn retracts a first pin **24** disposed within a hole through the side of the first inner tube member **21**. Once the first pin **24** is retracted, the user simply pushes down on the cantilevered handle grip **11** to retract the telescoping handle arm assembly **10**. In its fully retracted position, a second pin (not shown), engages the outer tubular member **19** in order to hold the telescoping handle arm assembly **10** in a locked position. In this position, the

handle grip **11** is secured within the handle grip cradle **8**, by means of a small indent disposed within the grip front end **15** which mates with a retractable flange member disposed within the cradle **8**. In order to release the handle grip **11** and telescoping handle arm assembly **10**, the user pushes down on the release button **5**, which retracts the second pin and the handle grip **11** rotates away from the retractable flange member.

Further, the present invention has been disclosed as having one fixed outer tubular member and two telescoping inner tubular members, it will be readily apparent to those skilled in the art that depending upon the size of the luggage case, the invention includes a single, fixed tubular member without any corresponding telescoping members; and includes a fixed outer tubular member with only one telescoping member or more than two such members.

FIG. 4 presents a "see through" perspective drawing of the luggage case **1** as shown in FIG. 2 with the luggage compartment **6** shown in dashed lines in order to reveal the luggage frame **16** as viewed from the back of the case **1**.

A profile view of the telescoping handle arm assembly **10** and cantilevered handle grip **11**, removed from the luggage case **1**, is illustrated in FIG. 5. This figure shows in more detail the exact telescoping relationship of the outer tubular member **19**, first inner tubular member **21** and second inner tubular member **22**, each in its extended position.

FIG.'s **6a** and **6b** illustrate the functional aspect of the cantilevered handle grip **11** which more uniformly distributes the weight of the luggage case **1** across the user's hand when the case **1** is being pulled. FIG. **6a** depicts the handle grip in its fully rotated position which is caused by the user applying an upward force against the handle grip **11**, normally while pulling the luggage case **1**. FIG. **6b** shows the handle grip **11** in its relaxed and unbiased position, which is its state when the user is not applying any upward force against the bottom portion of the handle grip **11**. A resilient element, such as a spring, is integral with the hinge assembly **14** such that when the user rotates the handle grip **11** upwards, a counter rotational force is created which pushes the handle grip downward and into the user's hand. In this manner, while the luggage case **1** is being pulled, the weight of the luggage case **1** is more evenly distributed across the user's hand, rather than concentrated at only the front part of the hand.

The hinge assembly **14** contains an integral upward stop flange **25** disposed on an outside portion of the hinge assembly **14** and an integral downward stop flange **26**, disposed on an inside portion of the hinge assembly **14**. As shown in FIG **6a**, the upward rotation of the handle grip **11**, caused by a user pulling up on the grip **11**, is limited to an orientation which is approximately perpendicular to the telescoping handle arm assembly **10** when the upward stop flange **25** abuts against the telescoping handle arm assembly's top end **13**. And, as shown in FIG **6b**, the downward rotation of the handle grip **11**,

caused by the spring, is limited to an orientation in which the grip 11 is in a position which is approximately 30° below the grip's perpendicular orientation to the telescoping handle arm assembly 10, when the downward stop flange 26 abuts against the telescoping handle arm assembly's top end 13. Experiments have shown that this range of rotational motion is ergonomically beneficial in that the motion allows the user's hand and wrist to remain comfortably aligned with the forearm, while pulling the luggage with the arm swinging back and forth at the user's side.

While the present invention has been described with reference to a few embodiments, the description is illustrative of the invention and is not to be construed as limiting the invention. Various modifications may occur to those skilled in the art without departing from the scope of the invention as defined by the appended claims.

CLAIMS

We claim:

1. A wheeled luggage apparatus, comprising:
 - a) a wheeled luggage case;
 - b) a handle assembly attached to the wheeled luggage case;
 - c) a cantilevered handle grip rotatably attached to the handle assembly such that the plane of rotation of the grip is approximately parallel to the rolling direction of the wheeled luggage case.
2. The cantilevered handle grip of claim 1 further having a hinge assembly which rotatably attaches the grip to the handle assembly.
3. The hinge assembly of claim 2 further having a resilient element which supplies a force to the cantilevered handle grip and to the handle assembly, urging the grip to rotate downwardly around the hinge.
4. The hinge assembly of claim 2 further having an upward stop flange and a downward stop flange which limit the rotation of the cantilevered hand grip around the hinge assembly to approximately 30°.
5. The hinge assembly of claim 4 in which the upward stop flange is positioned on an outside portion of the hinge such that the upward stop flange limits the upward rotation of the cantilevered

handle grip to a position in which the grip is approximately perpendicular to the handle assembly.

6. The resilient element of claim 3 in which the element is a spring.

7. A wheeled luggage apparatus, comprising:

- a) a wheeled luggage case;
- b) a telescoping handle arm assembly attached to the wheeled luggage case; and
- c) a cantilevered handle grip rotatably attached to the telescoping handle arm assembly such that the plane of rotation the grip is approximately parallel to the rolling direction of the wheeled luggage case.

8. The cantilevered handle grip of claim 7 further having a hinge assembly which rotatably attaches the grip to the telescoping handle arm assembly.

9. The hinge assembly of claim 8 further having a resilient element which supplies a force to the cantilevered handle grip and to the telescoping handle arm assembly, urging the grip to rotate downwardly around the hinge.

10. The hinge assembly of claim 8 further having an upward stop flange and a downward stop flange which limit the rotation of the cantilevered handle grip around the hinge assembly to approximately 30°.

11. The hinge assembly of claim 10 in which the upward stop flange is positioned on an outside portion of the hinge such that the

upward stop flange limits the upward rotation of the cantilevered handle grip to a position which is approximately perpendicular to the telescoping handle arm assembly.

12. The resilient element of claim 9 in which the element is a spring.

13. The cantilevered handle grip of claim 7 in which a top surface of the grip is flush with an upright end of the wheeled luggage case, when the telescoping handle arm assembly is in a fully retracted position.

14. The wheeled luggage case of claim 7 further having a grip cradle disposed within an upright end of the case, the grip cradle having a grip locking assembly which secures the cantilevered handle grip within the cradle when the telescoping handle arm assembly is in a fully retracted position, allowing the grip to be used to carry the wheeled luggage apparatus.

15. The cantilevered handle grip of claim 7 further having a release button disposed within the grip, allowing a user to depress the button to unlock the grip from the grip locking assembly.

16. The release button of claim 15 in which the button is adjacent to a back end of the cantilevered handle grip.

17. The release button of claim 15 in which the button is flush with a top surface of the cantilevered handle grip.

18. A wheeled luggage apparatus, comprising:
a) a wheeled luggage case;

b) a telescoping handle arm assembly attached to the wheeled luggage case;

c) a hinge assembly which rotably attaches a cantilevered handle grip to a top end of the telescoping handle arm assembly such that the plane of rotation of the grip is approximately parallel to the rolling direction of the wheeled luggage case,

d) a resilient element disposed within the hinge assembly which supplies a force to the cantilevered handle grip and to the telescoping handle arm assembly, urging the grip to rotate downwardly around the hinge;

e) an upward stop flange which is disposed on an outside portion of the hinge such that the flange abuts against the top end of the telescoping handle arm assembly and limits the upward rotation of the cantilevered handle grip around the hinge to a position in which the grip is oriented approximately perpendicular to the handle arm assembly; and

f) a downward stop flange which is disposed on an inside portion of the hinge such that the flange abuts against the top end of the telescoping handle arm assembly and limits the downward rotation of the cantilevered handle grip to a position which is approximately 30° below the grip's perpendicular orientation to the handle arm assembly.

19. The resilient element of claim 18 in which the element is a spring.

20. The cantilevered handle grip of claim 18 in which a top surface of the grip is flush with an upright end of the wheeled luggage case, when the telescoping handle arm assembly is in a fully retracted position.

21. The wheeled luggage case of claim 18 further having a grip cradle disposed within an upright end of the case, the grip cradle having a grip locking assembly which secures the cantilevered handle grip within the cradle when the telescoping handle arm assembly is in a fully retracted position, allowing the grip to be used to carry the wheeled luggage apparatus.

22. The cantilevered handle grip of claim 18 further having a release button disposed within the grip, allowing a user to depress the button to unlock the grip from the grip locking assembly.

23. The release button of claim 22 in which the button is adjacent to a back end of the cantilevered handle grip.

24. The release button of claim 22 in which the button is flush with a top surface of the cantilevered handle grip.

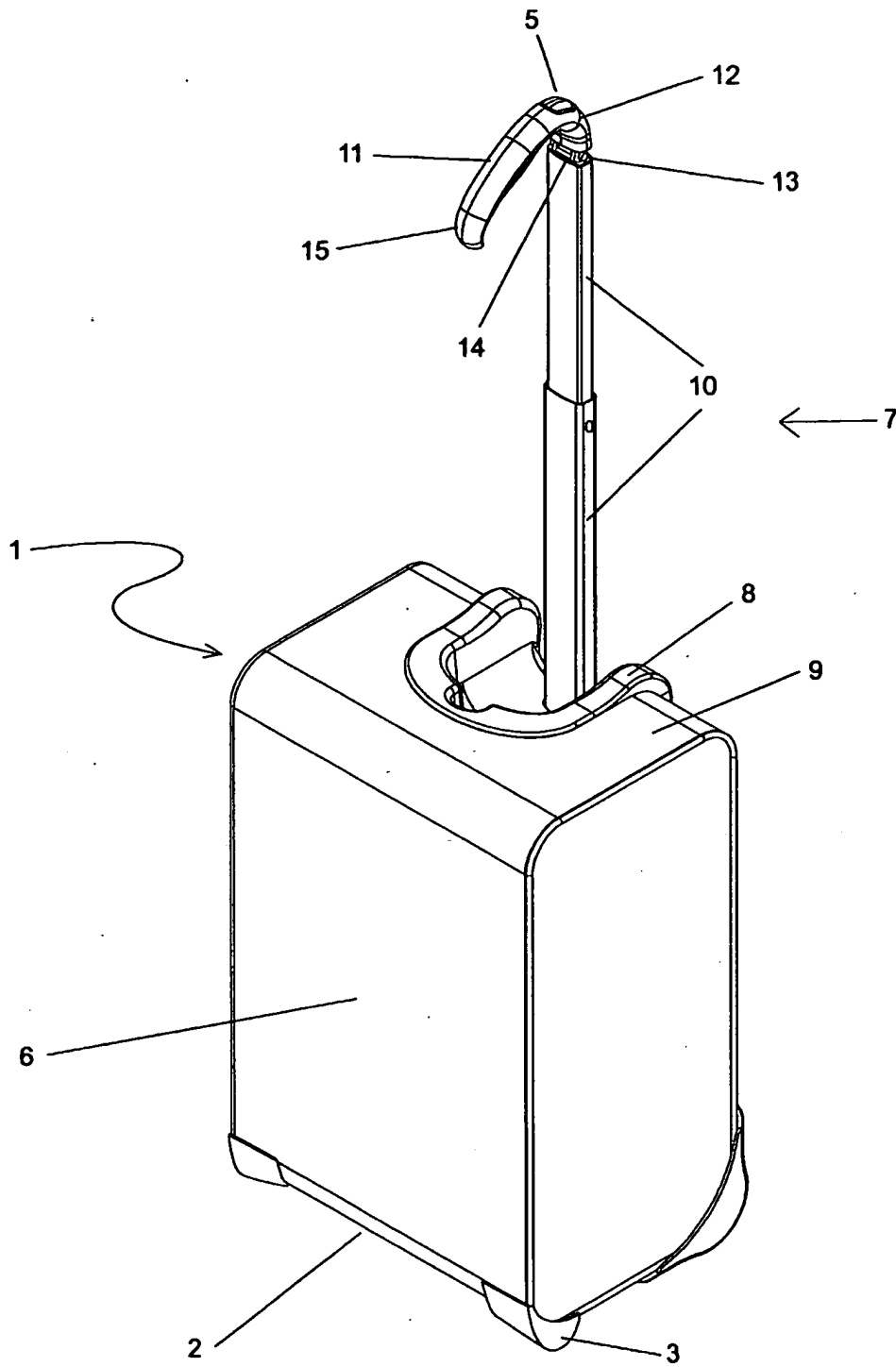


FIG. 1

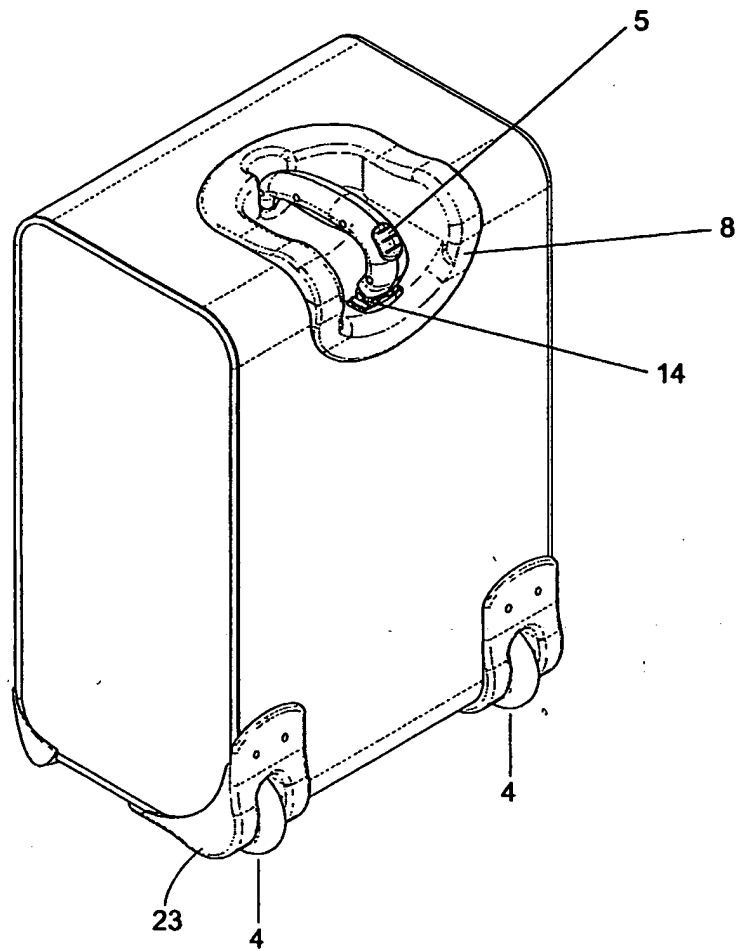


FIG. 2

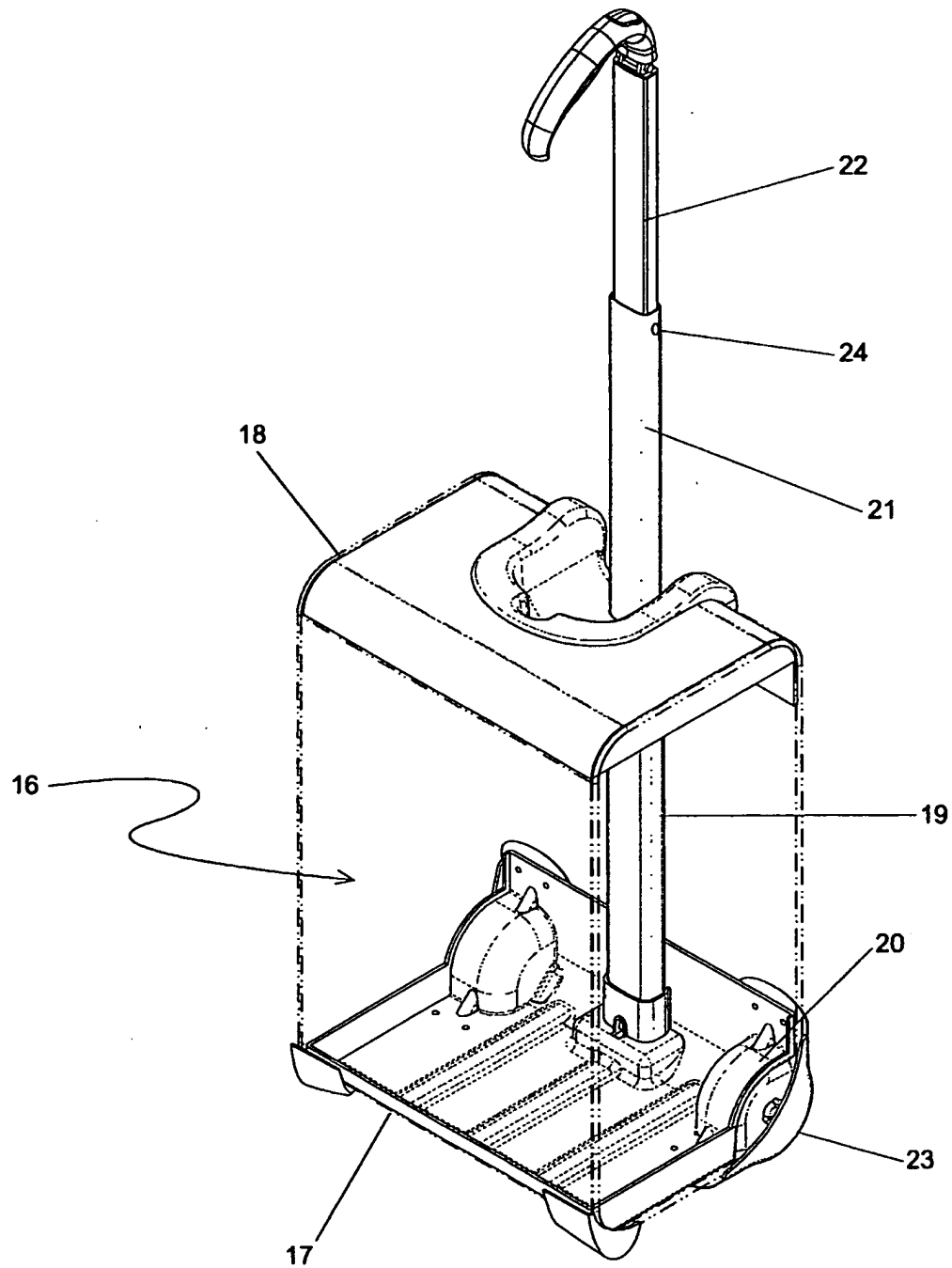


FIG. 3

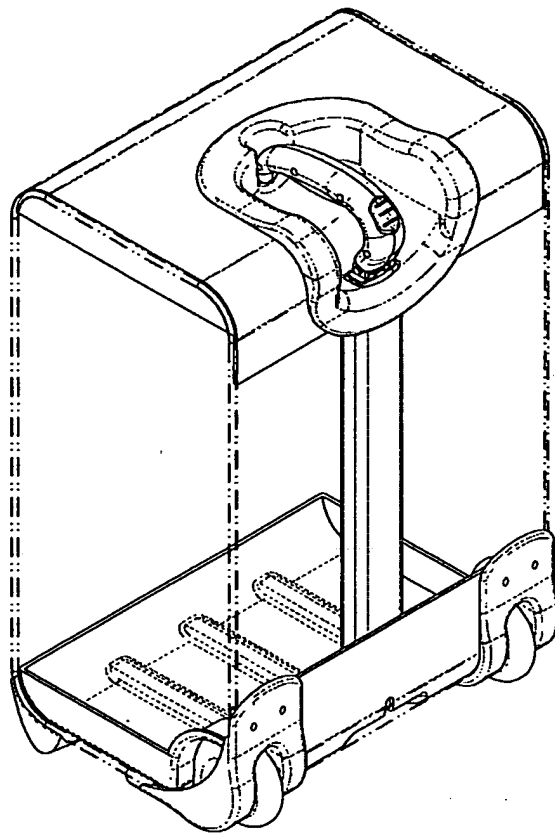


FIG. 4

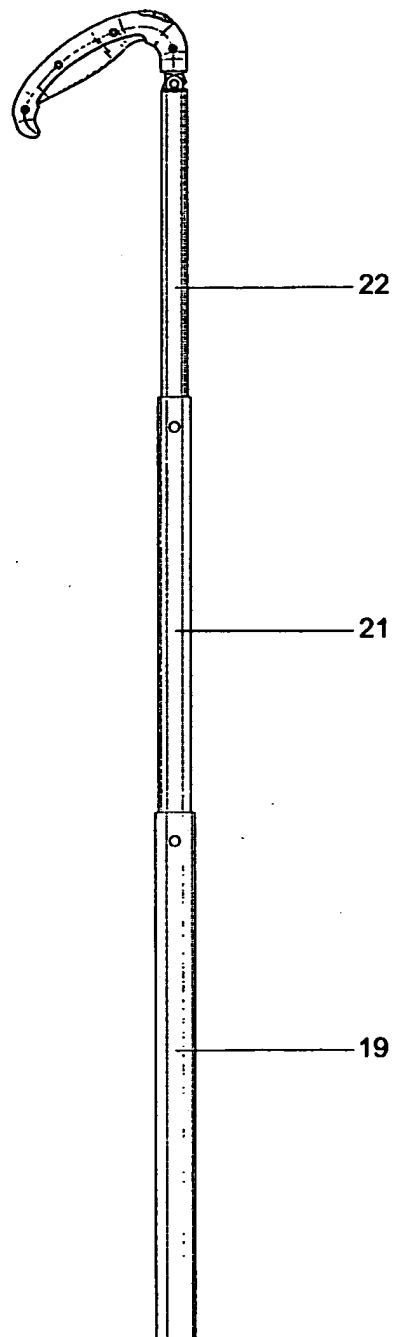


FIG. 5

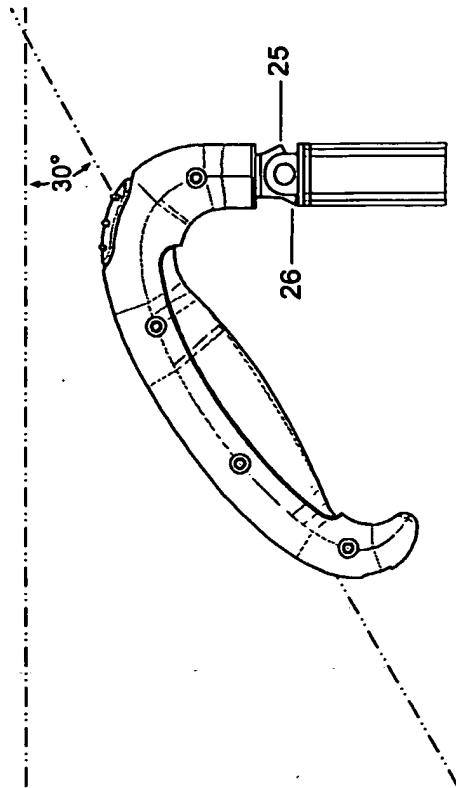


FIG. 6b

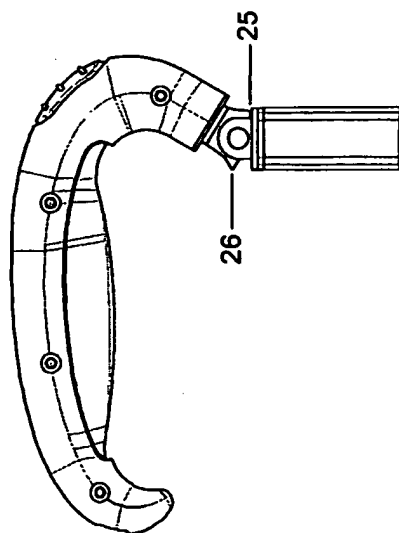


FIG. 6a

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/28054

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A45C 5/14, 13/26
US CL : 190/39, 115; 16/113.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 190/39, 115; 16/113.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,343,988 A (BARTSCH ET AL) 06 SEPTEMBER 1994 (06.09.1994), note members 1 and 5 of Figures 1 and 2.	1-3, 6-9 and 12
Y		4, 5, 10, 11 and 13-17
Y	US 5,075,925 A (MALONEY) 31 DECEMBER 1991 (31.12.1991), note member 112 in Figures 6 and 7.	4, 5, 10 and 11
Y	US 5,579,877 A (HOMAYOON) 03 DECEMBER 1996 (03.12.1996), note member 132 in Figure 5.	13 and 14
Y	US 4,538,709 A (WILLIAMS ET AL) 03 SEPTEMBER 1985 (03.09.1985), note member 52 in Figures 9 and 10.	15-17
A	US 5,353,900 A (STILLEY) 11 OCTOBER 1994 (11.10.1994).	
A	US 4,261,077 A (BROCK ET AL) 14 APRIL 1981 (14.04.1981).	
A	US 5,901,822 A (TU) 11 MAY 1999 (11.05.1999).	
A	US 4,561,526 A (WINTER ET AL) 31 DECEMBER 1985 (31.12.1985).	

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

24 October 2002 (24.10.2002)

Date of mailing of the international search report

03 JAN 2003

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PUB-NO: WO003020069A1

DOCUMENT-IDENTIFIER: WO 3020069 A1

TITLE: HANDLE APPARATUS FOR LUGGAGE CASE

PUBN-DATE: March 13, 2003

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HAN NOAH M	US
YANG SUNG O	US

APPL-NO: US00228054

APPL-DATE: September 5, 2002

PRIORITY-DATA: US31753101P (September 5, 2001)

INT-CL (IPC): A45C005/14, A45C013/26

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